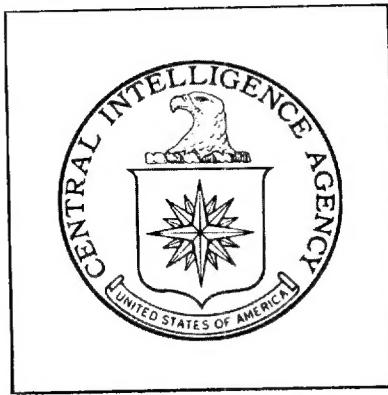


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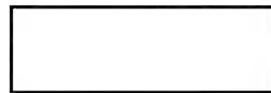


DIRECTORATE OF
INTELLIGENCE

Imagery Analysis Report

Expansion of Chinese Iron and Steel Plants

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IMAGERY ANALYSIS SERVICE

EXPANSION OF CHINESE IRON AND STEEL PLANTS

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SUMMARY

This study of four major and 27 secondary iron and steel plants, representing all but a fraction of this Communist Chinese industry, reveals continued expansion since the fall of [redacted]. The largest portion of the expansion occurred in the steel making, fabrication, and rolling facilities. Two basic oxygen furnace buildings for steel making have been firmly identified, one at the Shih-ching-shan Iron and Steel Plant and the other at the Shang-hai Iron and Steel Plant No. 1, and one is tentatively identified at the Tai-yuan Iron and Steel Plant. Five rolling mills have been lengthened, a new 1,910-foot rolling mill has been completed at the Tai-yuan Iron and Steel Plant, and a new 2,350-foot rolling mill has been completed at the Wu-han Iron and Steel Plant. Two side-blown converter shops were converted to rolling mills, and the construction of four other rolling mills was seen in progress. In addition, four new fabrication buildings were constructed and three were seen in the early stages of construction. Also noted was the removal of several of the smaller blast furnaces.

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In all, expansion or modification was observed at 16 Communist Chinese iron and steel plants. Of these 16, 13 underwent major expansion.

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25X1 Figure 1. Cheng-tu Seamless Steel Pipe Plant,
[redacted] (photograph)

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25X1 Figure 2. Chiang-ku Iron Plant,
[redacted] (photograph)

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25X1 Figure 4. Chu-chiang Iron and Steel Plant,
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25X1 Figure 5. Fu-shun Iron and Steel Plant,
[redacted] (photograph)

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25X1 Figure 6. Hang-chou Iron and Steel Plant,
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25X1 Figure 7. Lu-ta Steel Plant,
[redacted] (photograph)

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25X1 Figure 8. Ma-an shan Iron and Steel Plant,
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25X1 Figure 9. Nan-chang Iron and Steel Plant,
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Figure 20. Ti-hua Iron and Steel Plant,
[redacted] (photograph) 58

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Figure 21. Wu-han Iron and Steel Plant,
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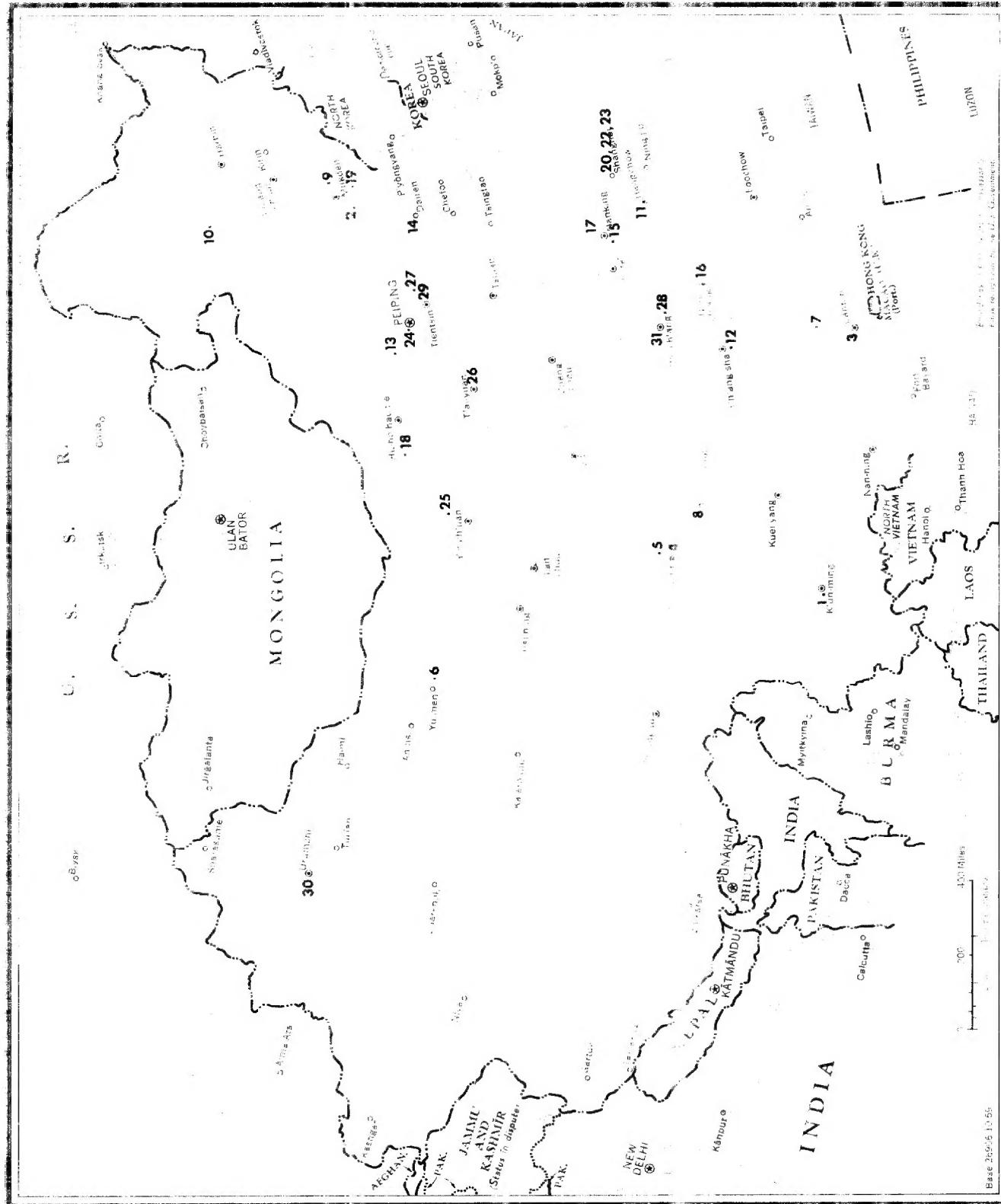


FIGURE 1. LOCATION MAP

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INTRODUCTION

This report is based on [redacted] photographic coverage of 31 iron and steel plants in Communist China. A search for additional iron and steel plants reported at Hsi-chang (27-53N 102-18E) and Hsi-ning (36-40N 101-50E) failed to reveal any iron or steel making facilities.

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The purpose of this study was to identify any new construction or modification revealed by recent photography of the major Communist Chinese iron and steel plants. When early [redacted] photography was not available, [redacted] imagery was utilized. In order that recent changes be reported, [redacted] imagery was also used. This report includes annotated photographic enlargements of the plants where significant new facilities have recently been constructed. Enlargements are also included of the plants where previously unreported facilities have been identified.

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All measurements have been made by the NPIC Technical Intelligence Division with the exception of those indicated by an asterisk (*), which were made by the Imagery Analysis Service project analyst. The NPIC/TID measurements are considered to be accurate within \pm 5 feet or \pm 5%, whichever is greater.

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AN-NING IRON AND STEEL PLANT

The An-ning iron and Steel Plant is located 1 nautical mile (nm) south of An-ning, China, at 24-55N 102-30E (Figure 1, Item 1).

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This plant was studied from photography

No significant change was observed to the plant's facilities between [redacted]. The plant contains four medium blast furnaces, two side-blown converter shops, a blooming/slabbing mill, a rolling mill, a firebrick plant, and a static construction area. All facilities appeared moderately active on the [redacted] imagery. The static construction area has not changed since it was first seen on [redacted] imagery.

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The following annotations are keyed to Figure 1:

| Annotation | Facility |
|------------|----------------------------|
| 1 | Brick and Ceramics Plant |
| 2 | Static Construction Area |
| 3 | Firebrick Plant |
| 4 | Rolling Mill |
| 5 | Blooming/Slabbing Mill |
| 6 | Side-Blown Converter Shop |
| 7 | Four Medium Blast Furnaces |
| 8 | Raw Materials Yard |
| 9 | Side-Blown Converter Shop |

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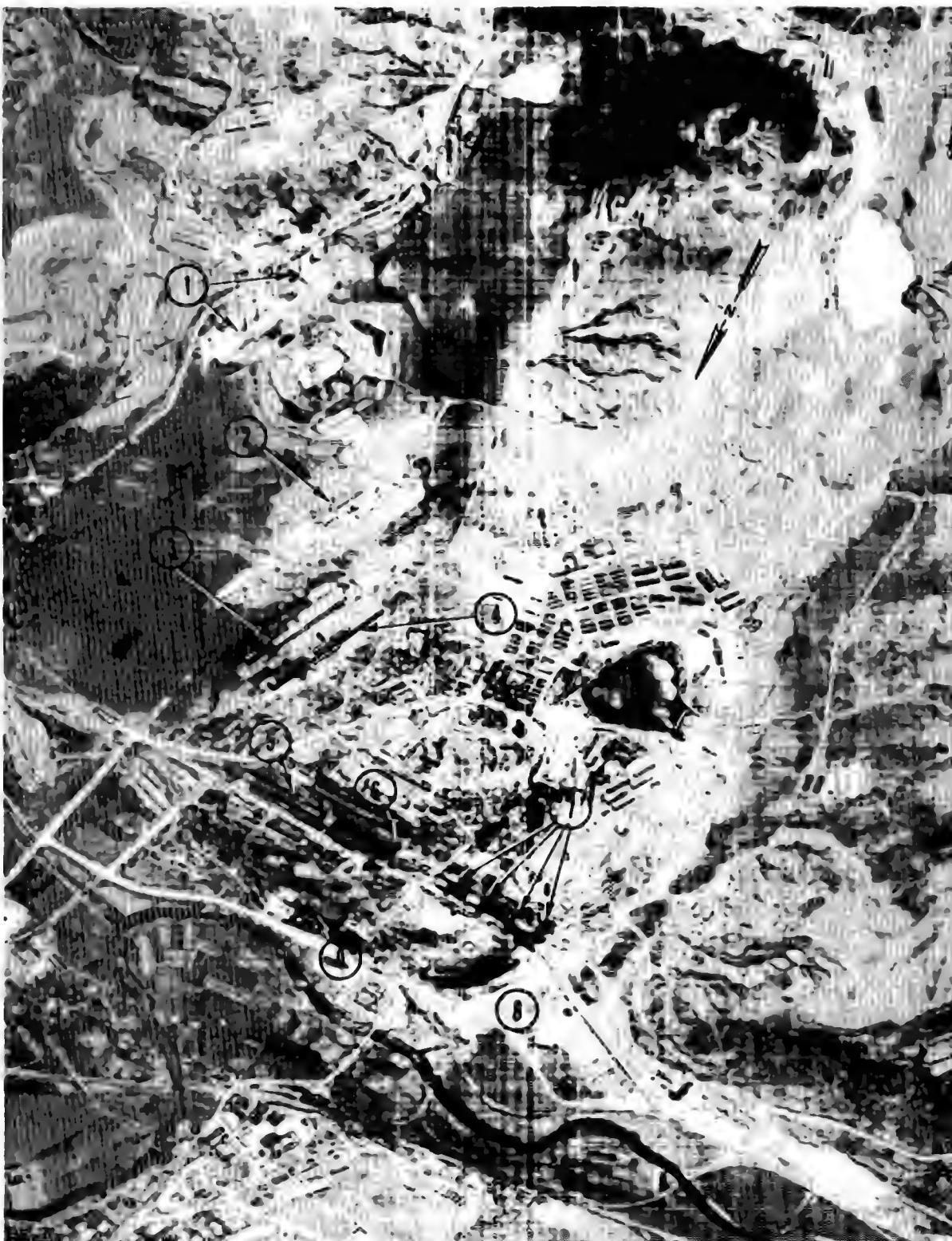


FIGURE 2. AN-NING IRON AND STEEL PLANT.

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AN-SHAN IRON AND STEEL PLANT

The An-shan Iron and Steel Plant is located in the northwest sector of An-shan, China, at 41-08N 122-59E (Figure 1, Item 2).

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This plant was studied from imagery of [redacted]. [redacted] During this time interval no significant change occurred to the plant's facilities. All facilities at the plant appeared highly active on both dates.

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This plant contains twelve by-products coke oven batteries with an associated by-products area, ten large blast furnaces, three open hearth furnace buildings, a thermal power plant, a soaking pit, five rolling mills, an iron ore processing plant, and a limestone preparation plant.

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CANTON IRON AND STEEL PLANT

The Canton Iron and Steel Plant is located on the southwest edge of Canton, China, at 23-04N 113-14E (Figure 1, Item 1).

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An analysis of this plant was accomplished from imagery [redacted]. During this time interval the only change that occurred was the initial construction of a probable rolling mill. This rolling mill was still in the early stages of construction on the latest available imagery of the plant dated [redacted].

The facilities at this plant include two by-products coke ovens, blast furnaces with a limited by-products section, two medium blast furnaces, a side-blown converter shop, a probable fabrication building, three blooming/slabbing mills, and a building foundation. These facilities appeared moderately active on [redacted].

The following annotations are keyed to Figure 1:

| Annotation | Facility |
|------------|------------------------------------|
| 1 | Side-Blown Converter Shop |
| 2 | Two Blooming/Slabbing Mills |
| 3 | Two Medium Blast Furnaces |
| 4 | Two By-Product Coke Oven Batteries |
| 5 | Coke By-Products Section |
| 6 | Probable Rolling Mill (U/C) |
| 7 | Two Abandoned Blast Furnaces |
| 8 | Blooming and Slabbing Mill |
| 9 | Probable Fabrication Building |
| 10 | Building Foundation |

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FIGURE 3. CANTON IRON AND STEEL PLANT.

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CHENG-TU SEAMLESS STEEL PIPE PLANT

The Cheng-tu Seamless Steel Pipe Plant is located on the southeast edge of Cheng-tu, China, at 30-38N 104-06E (Figure 1, Item 4).

An analysis of this plant was accomplished from imagery [redacted]

[redacted] one rolling mill was lengthened by approximately 1,200 feet*. Then between [redacted] a second rolling mill was lengthened by approximately 250 feet*, and a producer gas plant and six support buildings were constructed. The facilities at the plant now consist of two rolling mills, two fabrication buildings, a producer gas plant, and numerous support buildings. All of these facilities appeared highly active on the three missions from which they were analyzed.

The following annotations are keyed to Figure 4:

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|--|
| 1 | Rolling Mill |
| 2 | Rolling Mill Addition (approx. 250 feet) |
| 3 | Two Fabrication Buildings |
| 4 | Rolling Mill Addition (approx. 1,200 feet) |
| 5 | Rolling Mill |
| 6 | Producer Gas Plant |

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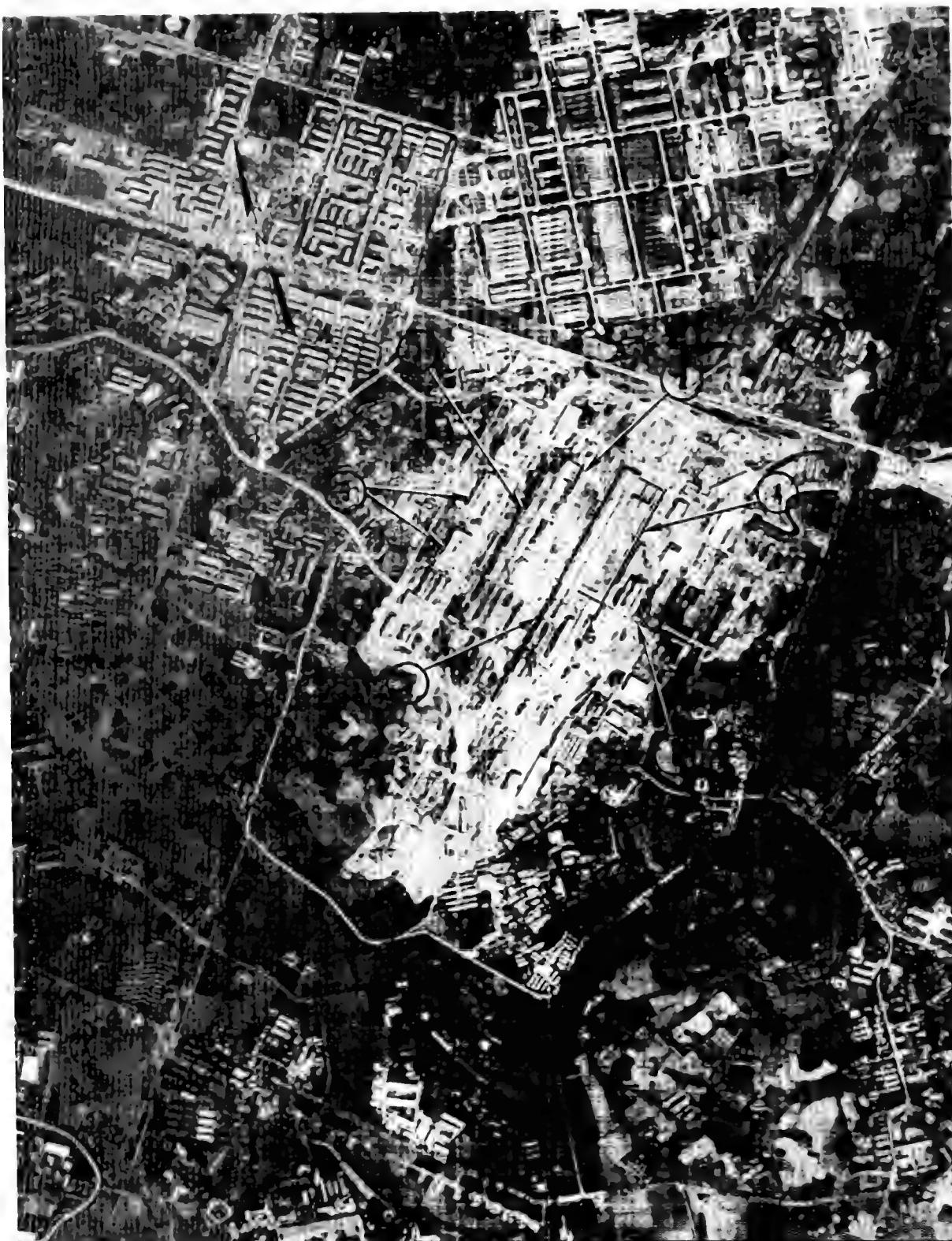


FIGURE 4. CHENG-TU SEAMLESS STEEL PIPE PLANT.

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CHIANG-YU IRON PLANT

The Chiang-yu Iron Plant is located 76 nm north-northwest of Cheng-tu, China, on the Fou-chiang River at 31-46N 104-46E (Figure 1, Item 5).

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This plant was studied from imagery [redacted]. The changes during this time interval include the complete construction of two fabrication buildings and 33 support buildings, and the initial construction of two probable fabrication buildings. The facilities now consist of eight beehive coke ovens, two small blast furnaces, four fabrication buildings (two of them under construction), a rolling mill, and numerous support buildings. All facilities appeared moderately active on [redacted].

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The following annotations are keyed to Figure 5:

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|-------------------------------------|
| 1 | Eight Beehive Coke Ovens |
| 2 | Probable Fabrication Building (U/C) |
| 3 | Two Small Blast Furnaces |
| 4 | Two Fabrication Buildings |
| 5 | Rolling Mill |
| 6 | Probable Fabrication Building (U/C) |

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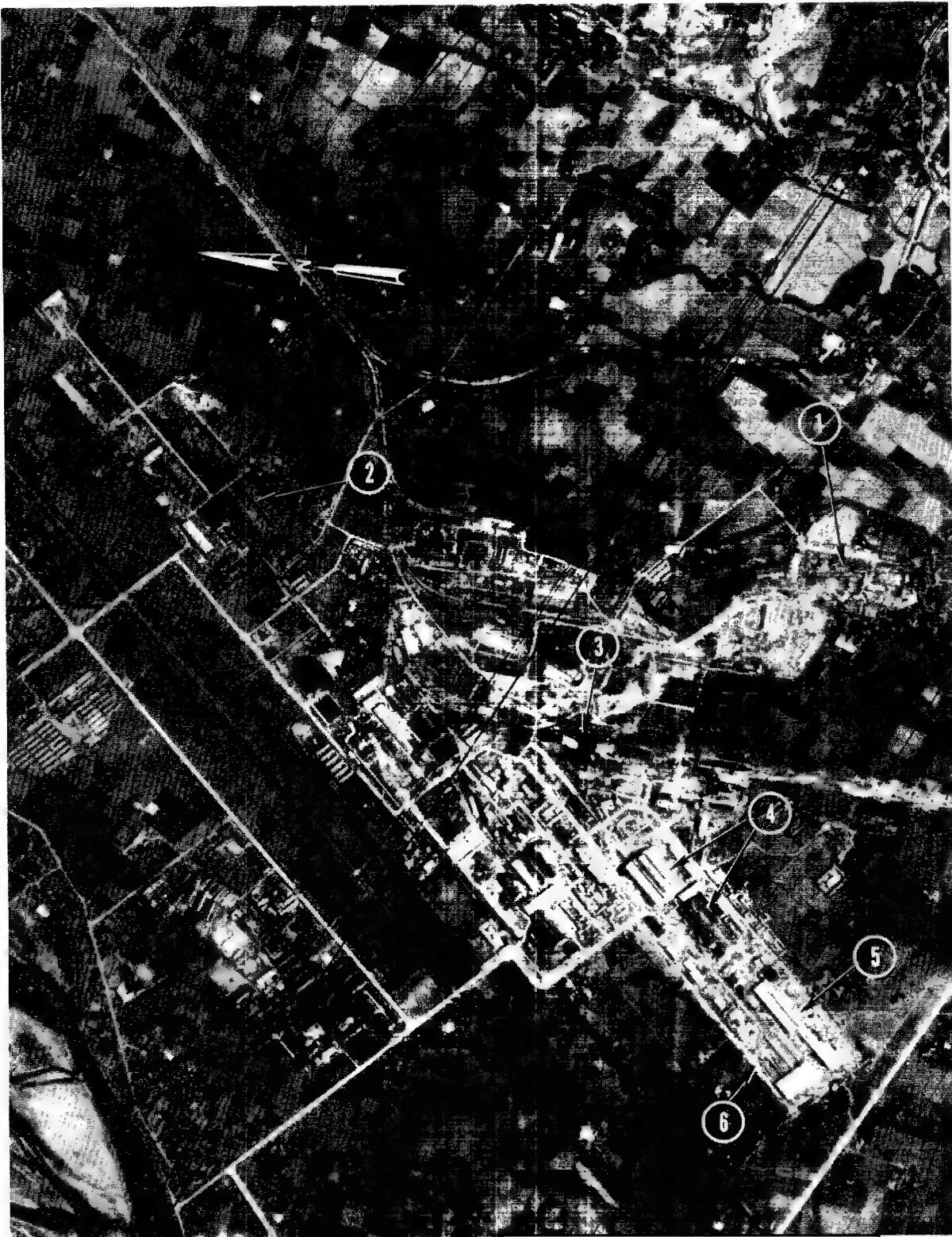


FIGURE 5. CHIANG-YU IRON PLANT

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CHIU-CHUAN IRON AND STEEL PLANT

The Chiu-chuan Iron and Steel Plant is located 10 km northwest of Chiu-chuan, China, at 30°48'N 098°20'E (Figure 1, Item 6).

An analysis of this plant was accomplished from imagery dated [redacted]

[redacted] During this time interval relatively few changes occurred. Minor construction was seen continuing on a large blast furnace, two by-products coke oven batteries, a by-products section, and a fabrication building. The blast furnace and fabrication building are in the final stages of construction, but further construction appears to have been stopped. Construction on the two by-products coke oven batteries in the by-products section appears inactive and is still in an early stage.

The completed facilities at the plant consist of 12 beehive coke ovens, a fabrication building, and a thermal power plant. Of these facilities, only the power plant appears active. This power plant is probably operating to serve the housing and support facilities in the center of the plant area.

The following annotations are keyed to Figure 1:

| Annotation | Facility |
|------------|-------------------------------------|
| 1 | By-Products Coke Oven Section (U/C) |
| 2 | Two By-Products Coke Ovens (U/C) |
| 3 | Large Blast Furnace |
| 4 | Fabrication Building |
| 5 | Fabrication Building (U/C) |
| 6 | Thermal Power Plant |
| 7 | 12 Beehive Coke Ovens |

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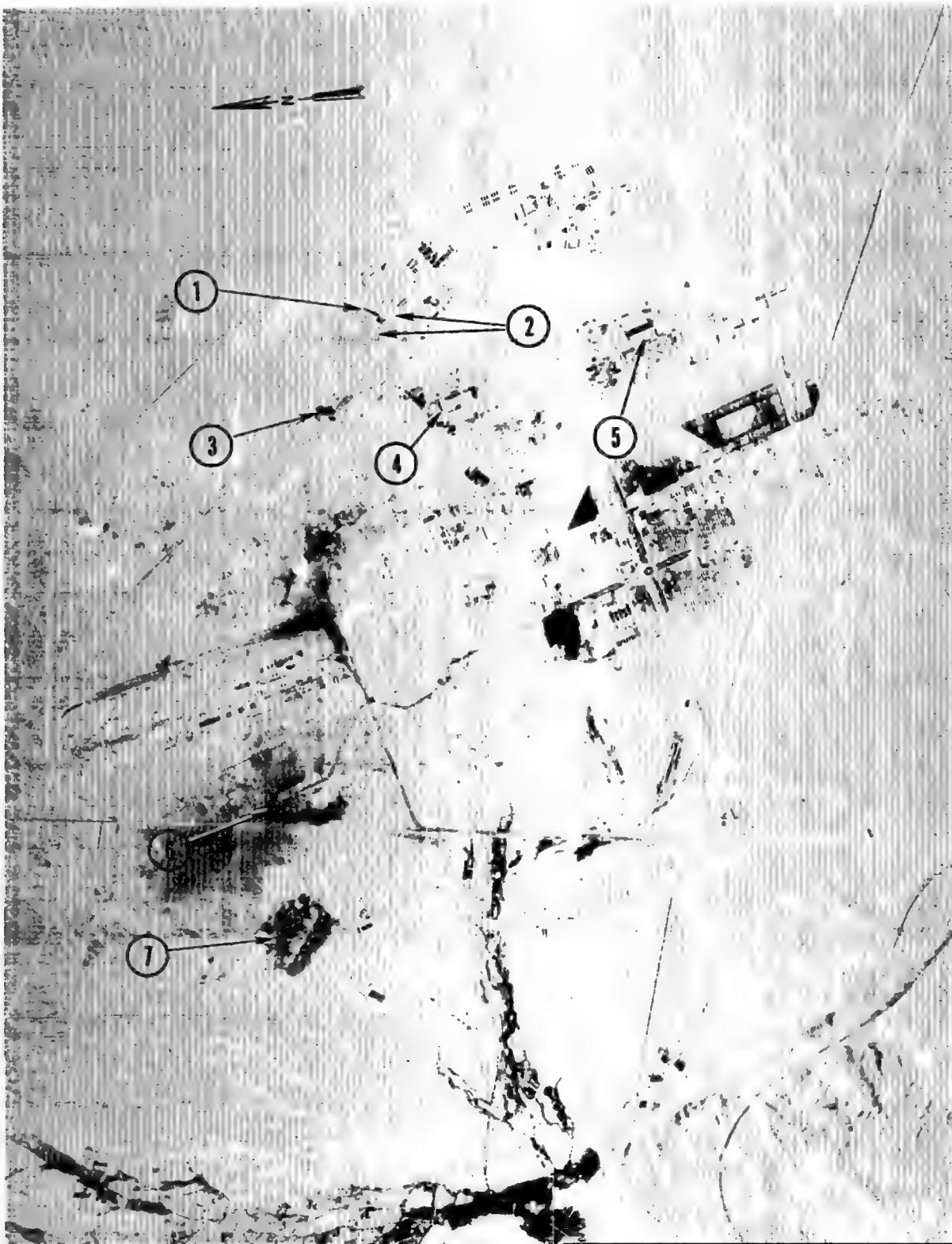


FIGURE 6. CHIU-CHUAN IRON AND STEEL PLANT.

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CHU-CHIANG IRON AND STEEL PLANT

The Chu-chiang (Shao-kuan) Iron and Steel Plant is located 7 nm south-southeast of Chu-chiang, China, at 24-42N 113-37E (Figure 1, Item 7).

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A comparative analysis of this plant was made from imagery dated [redacted]. The analysis revealed no change to the facilities between [redacted]. The plant appears abandoned and deteriorated with only one small blast furnace and one fabrication building still identifiable.

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The following annotations are keyed to Figure 1:

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|----------------------|
| 1 | Fabrication Building |
| 2 | Blast Furnace |

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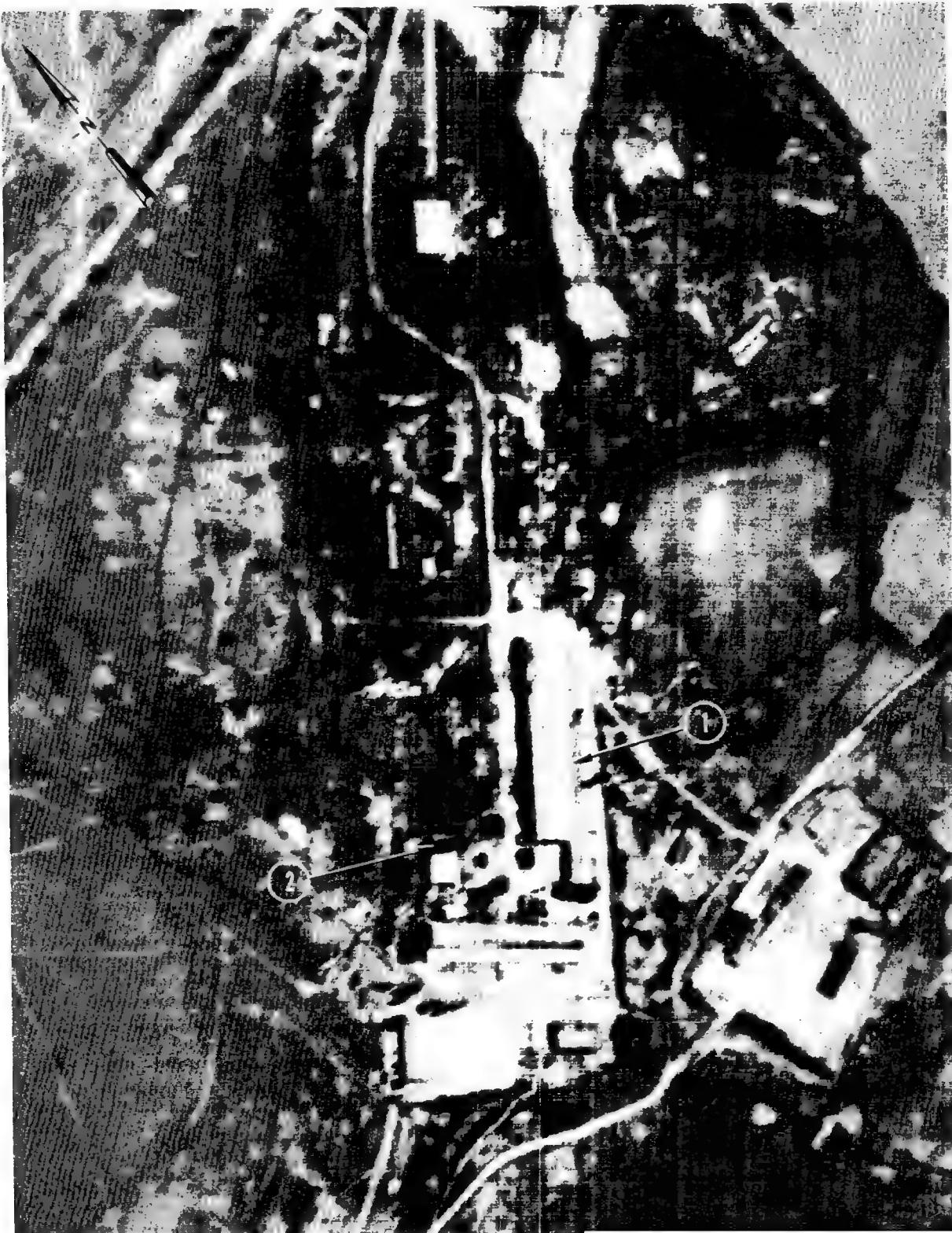


FIGURE 7. CHU-CHIANG IRON AND STEEL PLANT.

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CHUNG-CHING IRON AND STEEL PLANT

The Chung-ching Iron and Steel Plant is located on the west bank of the Yangtze River 3 nm south-southwest of Chung-ching, China, at 29-29N 106-29E (Figure 1, Item 8).

A study of this plant was made from imagery dated [redacted]

[redacted] The study revealed no significant change during this time interval. The plant was seen operating at a high level on [redacted] photographic missions from [redacted] The plant contains two by-products coke oven batteries with an associated by-products area, two medium blast furnaces, four small blast furnaces, a foundry, a side-blown converter shop, a two-stack open hearth furnace building, and three rolling mills.

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FU-SHUN IRON AND STEEL PLANT

The Fu-shun Iron and Steel Plant is located in the western section of Fu-shun, China, at 41-50N 123-48E (Figure 1, Item 9).

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A comparative analysis of this plant made from photographic imagery [redacted] revealed the change of a side-blown converter shop into a fabrication building (Annotation 7, Figure 7). No further change has been observed on photography [redacted]

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The facilities at the plant consist of eight beehive coke ovens, one small and two medium blast furnaces, an ore preparation plant, four rolling mills, a fabrication building, and a forge/foundry complex containing six buildings. All facilities except the beehive coke ovens and the blast furnaces appeared highly active on [redacted] photographic missions [redacted]. The coke ovens and blast furnaces appeared active [redacted] but since that time they have shown little activity.

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The following annotations are keyed to Figure 8:

| Annotation | Facility |
|------------|---|
| 1 | Ore Concentration Plant |
| 2 | Rolling Mill |
| 3 | Rolling Mill |
| 4 | Eight Beehive Coke Ovens |
| 5 | One Small and Two Medium Blast Furnaces |
| 6 | Fabrication Building |
| 7 | Rolling Mill (Former side-blown converter shop) |
| 8 | Rolling Mill |
| 9 | Forge/Foundry Complex |

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FIGURE 8. FUSHUN IRON AND STEEL PLANT.

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FU-LA-ERH-CHI STEEL PLANT

The Fu-la-erh-chi Steel Plant is located in the southern sector of Fu-la-erh-chi, China, at 47-11N 123-37E (Figure 1, Item 10).

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This plant was studied from photography [redacted]. The study revealed no significant change to the plant's facilities. The facilities at the plant consist of an open hearth furnace building with two stacks, a foundry, three heavy machine shops, and a producer-gas plant. Smoke seen emanating from the stacks serving the open hearth furnace building and the producer-gas plant on [redacted] coverage indicates a high degree of activity.

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HANG-CHOU IRON AND STEEL PLANT

The Hang-chou (Pan-shan) Iron and Steel Plant is located 6 nm north of Hang-chou, China, at 30-21N 120-10E (Figure 1, item 11).

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A comparative analysis of this plant from

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imagery revealed no change to the plant's facilities.

The plant contains six beehive coke oven batteries, three medium blast furnaces, a side-blown converter shop, a fabrication building, and two machine shops. The plant appeared moderately active on imagery dated

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The following annotations are keyed to Figure 1:

| Annotation | Facility |
|------------|---------------------------------|
| 1 | Three Medium Blast Furnaces |
| 2 | Machine Shop |
| 3 | Machine Shop |
| 4 | Six Beehive Coke Oven Batteries |
| 5 | Fabrication Building |
| 6 | Side-Blown Converter Shop |

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FIGURE 9. HANG-CHOU IRON AND STEEL PLANT,

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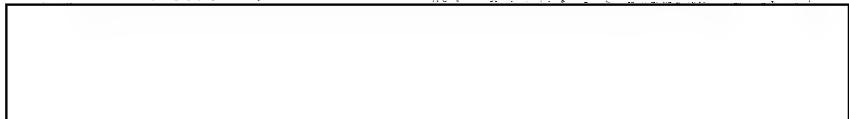
HSIANG-TAI IRON AND STEEL PLANT

The Hsians-tai Iron and Steel Plant is located 2.5 km south of Hs'eng-tan, China, at 27-48N 112-54E (Figure 1, Item 12).

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A comparative analysis of this plant from [redacted] and [redacted] imagery revealed no significant change to the facilities. The plant contains one by-products coke oven battery with an associated [redacted] [redacted] [redacted] [redacted] [redacted] [redacted]



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HSUAN-HUA IRON AND STEEL PLANT

The Hsuan-hua Iron and Steel Plant is located on the southern edge of Hsuan-hua, China, at 39-36N 115-02E (Figure 1, Item 13).

A study of this plant from [REDACTED] photography revealed the dismantling of five small blast furnaces. The facilities at the plant now consist of four medium and 11 small blast furnaces, a limestone preparation plant, a side-blown converter shop, and two by-products coke oven batteries with an associated by-products area. A moderate level of activity was seen on [REDACTED]

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[REDACTED] imagery.

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LU-TA STEEL PLANT

The Lu-ta Steel Plant is located in the northern section of Lu-ta, China, at 38-58N 121-37E (Figure 1, Item 14).

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A comparative analysis of this plant from photographic coverage [redacted] revealed the conversion of the plant's side-blown converter shop into a rolling mill (Annotation 16, Figure 9). The roof of this building was changed from a monitored roof to a saw-tooth roof during this time period. With this conversion the plant has no further capacity to produce steel. The only other change noted from [redacted] photographic coverage was the addition of one large support building (Annotation 15, Figure 9) to the plant.

25X1

The plant contains four rolling mills, three forge/foundries, one forge/machine shop, two foundry/machine shops, one machine shop, three fabrication buildings, a thermal power plant, a possible pattern shop, four multi-unit warehouses, and numerous support buildings. A moderate level of activity was seen on [redacted] imagery.

25X1

The following annotations are keyed to Figure 10:

| Annotation | Facility |
|------------|---|
| 1 | Engineering Building |
| 2 | Forge/Machine Shop |
| 3 | Fabrication Building |
| 4 | Fabrication Building |
| 5 | Foundry/Machin- Shop |
| 6 | Machine Shop |
| 7 | Rolling Mill |
| 8 | Four Multi-unit Warehouses |
| 9 | Foundry/Machin- Shop |
| 10 | Fabrication Building |
| 11 | Forge/Foundry |
| 12 | Possible Pattern Shop |
| 13 | Thermal Power Plant |
| 14 | Two Forge/Foundries |
| 15 | New Support Building |
| 16 | Rolling Mill (Previously a side-blown converter shop) |
| 17 | Two Rolling Mills |

6.3

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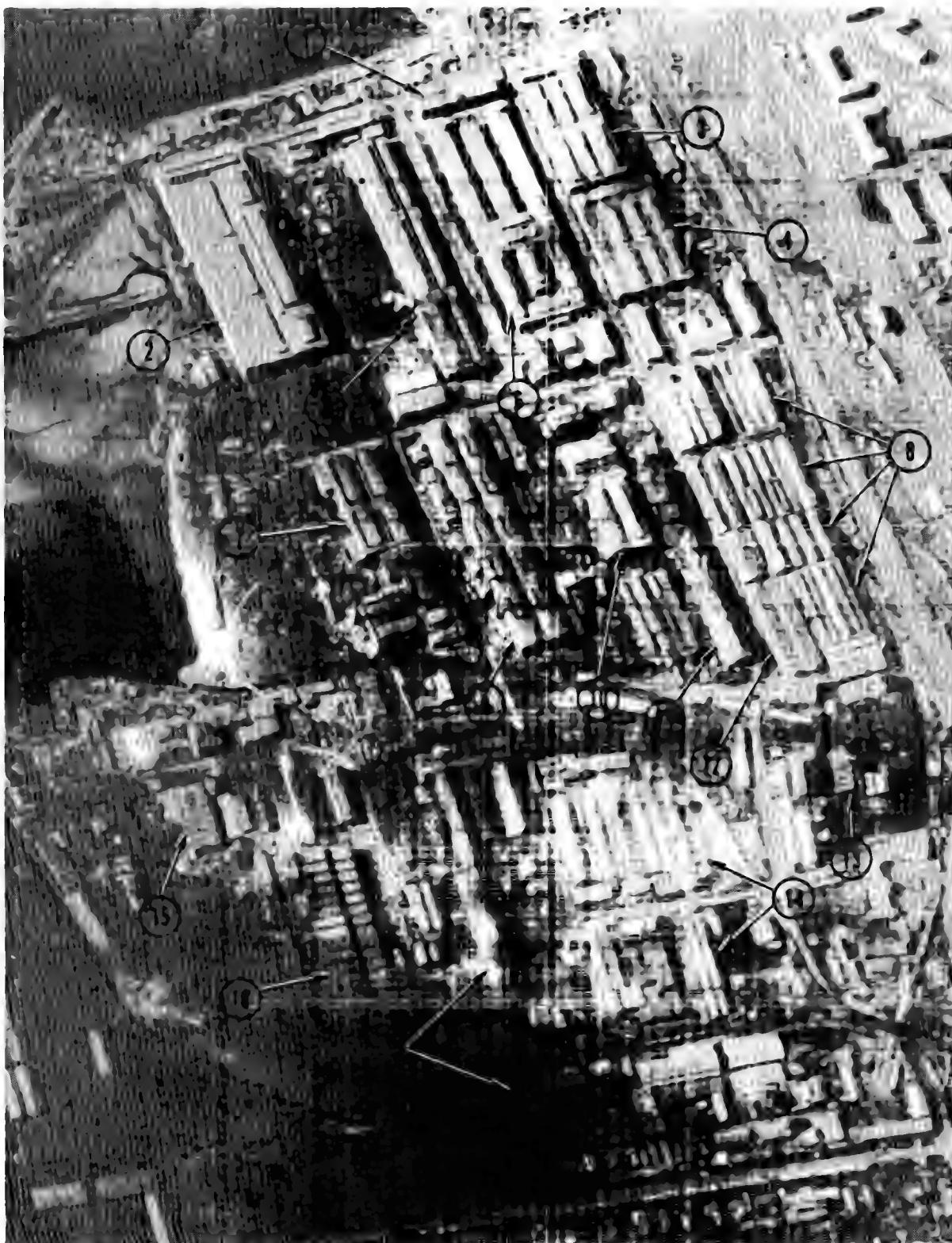


FIGURE 10. LU-TA STEEL PLANT

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IMAGERY ANALYSIS SERVICE

MA-AN SHAN IRON AND STEEL PLANT

The Ma-an Shan Iron and Steel Plant is located on the east bank of the Yangtze River approximately 25 nm downstream from Wu-hu, China, at 31-43N 118-29E (Figure 1, Item 15).

25X1

A study of this plant was accomplished from [redacted] imagery. The only change to the plant during this period was the removal of five medium blast furnaces. The plant now contains two by-products coke oven batteries with an associated by-products area, nine large, three medium, and four small blast furnaces, an open hearth furnace building, three side-blown converter shops, a blooming/slabbing mill with a soaking pit, a fabrication building, an iron ore sintering plant, a probable limestone preparation plant, a fire brick plant, a thermal power plant, and a rolling mill. These facilities appeared highly active on [redacted] imagery.

25X1

25X1

The following annotations are keyed to Figure 11:

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|---|
| 1 | Four Small Blast Furnaces |
| 2 | Blooming/Slabbing Mill with a Soaking Pit |
| 3 | Three Side-Blow Converter Shops |
| 4 | Fire Brick Plant |
| 5 | Four Large Blast Furnaces |
| 6 | Thermal Power Plant |
| 7 | Five Blast Furnaces Removed |
| 8 | Probable Limestone Preparation Plant |
| 9 | Three Medium Blast Furnaces |
| 10 | Iron Ore Sintering Plant |
| 11 | Five Large Blast Furnaces |
| 12 | Two By-Products Coke Oven Batteries |
| 13 | Coke By-Product Plant |
| 14 | Fabrication Building |
| 15 | Open Hearth Furnace Building |
| 16 | Rolling Mill |

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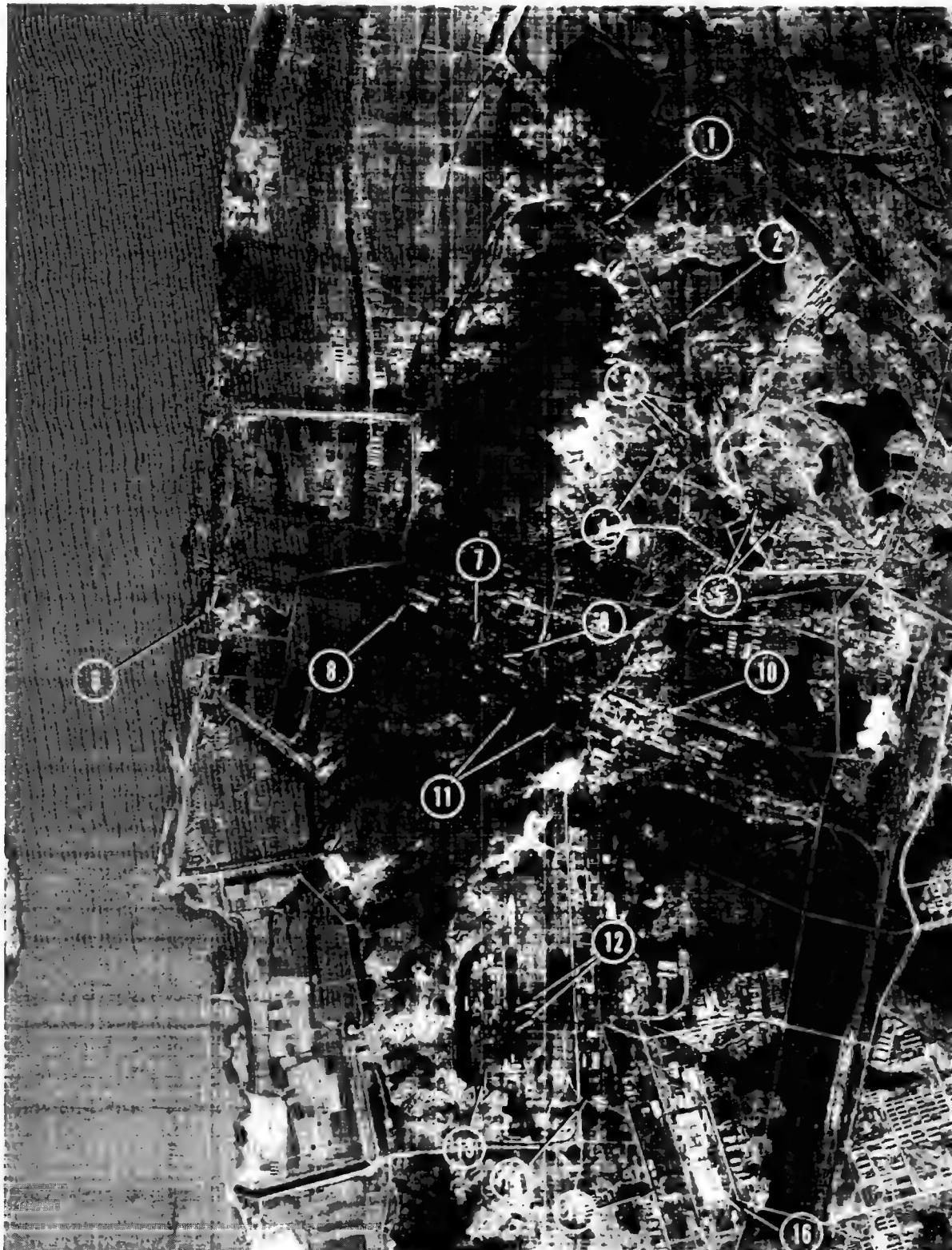


FIGURE 11. MA-AN SHAN IRON AND STEEL PLANT.

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IMAGERY ANALYSIS SERVICE

NAN-CHANG IRON AND STEEL PLANT

The Nan-chang Iron and Steel Plant is located 4 nm east of Nan-chang, China, at 28-38N 115-59E (Figure 1, Item 16).

This plant is served with electric power, from an electrical substation located 1.2 nm northeast of the plant.

A comparative analysis of [redacted] imagery revealed the lengthening of this plant's rolling mill by approximately 300 feet* (Annotation 5, Figure 11). This was the only change noted between the [redacted] photograph and coverage. The plant contains only six beehive coke ovens. Prior to [redacted] 44 other ovens were either dismantled or allowed to deteriorate.

The facilities at the plant include six beehive coke ovens, two medium blast furnaces, a side-blown converter shop, a rolling mill, and a limestone preparation plant. The beehive coke ovens did not appear active on [redacted] coverage, but all other facilities appeared highly active on that date.

The following annotations are keyed to Figure 12:

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|-----------------------------|
| 1 | Six Beehive Coke Ovens |
| 2 | Limestone Preparation Plant |
| 3 | Two Medium Blast Furnaces |
| 4 | Rolling Mill |
| 5 | Addition to Rolling Mill |
| 6 | Side-Blown Converter Shop |
| 7 | Probable Fertilizer Plant |
| 8 | Electric Substation |

25X1

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FIGURE 12. NAN-CHANG IRON AND STEEL PLANT

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IMAGFRY ANALYSIS SERVICE

NAN-CHING IRON AND STEEL PLANT

The Nan-ching Iron and Steel Plant is located 10 nm north of Nan-ching, China, on the northwest bank of the Yangtze River at 32-12N 118-45E (Figure 1, Item 17).

A study of this plant from [redacted] photo-graphic coverage revealed no significant change to the plant's facilities. The plant contains 44 beehive coke ovens, two medium blast furnaces, a side-blown converter shop, a rolling mill, and a limestone preparation plant. These facilities appeared to be only slightly active on [redacted] coverage.

25X1

25X1

The following annotations are keyed to Figure 1.3:

| Annotation | Facility |
|------------|-----------------------------|
| 1 | Thermal Power Plant |
| 2 | Beehive Coke Ovens (44) |
| 3 | Side-Blown Converter Shop |
| 4 | Rolling Mill |
| 5 | Two Medium Blast Furnaces |
| 6 | Limestone Preparation Plant |

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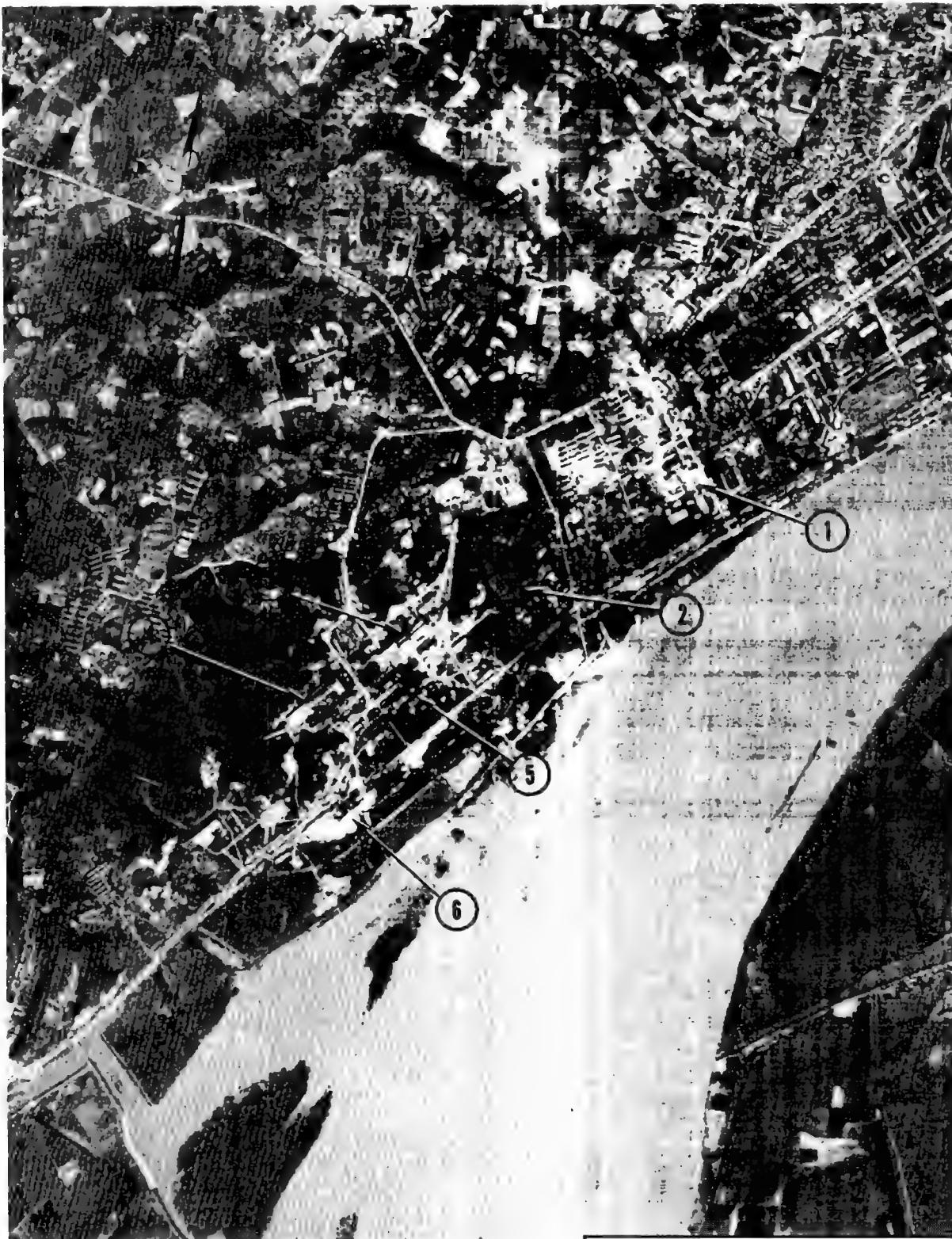


FIGURE 13. NAN-CHING IRON AND STEEL PLANT.

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IMAGERY ANALYSIS SERVICE

PAO-TOU IRON AND STEEL PLANT

The Pao-tou Iron and Steel Plant is located 1.5 nm west-northwest of Pao-tou, China, at 40-39N 109-46E (Figure 1, Item 18).

25X1

A comparative analysis of this plant was accomplished from [redacted] photography. This analysis revealed the completion of a soaking pit section (Annotation 9, Figure 13), the completion of a blooming/slabbing mill (Annotation 10, Figure 13), continued construction on a rolling mill (Annotation 12, Figure 13), continued construction on an extension to the open hearth furnace building (Annotation 7, Figure 13), and the construction of an unidentified facility (Annotation 11, Figure 13). The extension of the open hearth furnace building is nearing completion, and the construction on the new rolling mill is approximately 50 per cent completed.

25X1

The plant now contains three by-products coke oven batteries with an associated by-products section, two large blast furnaces, an open hearth furnace building, a thermal power plant, a soaking pit, a blooming/slabbing mill, a finishing mill under construction, an ore concentration plant, an ore sintering plant, five fabrication buildings, and a fire brick plant. In addition to these facilities, ten small blast furnaces in the Pao-tou area provide iron to this iron and steel plant. Ten other small blast furnaces that were in the area have been removed. All production facilities appeared highly active on [redacted] imagery with the exception of four of the small blast furnaces.

25X1

The following annotations are keyed to Figure 14:

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|--|
| 1. | Ore Concentration Plant |
| 2 | Coke By-Product Plant |
| 3 | Thermal Power Plant |
| 4 | Three By-Products Coke Oven Batteries |
| 5 | Ore Sintering Plant |
| 6 | Open Hearth Furnace Building |
| 7 | New Addition to Open Hearth Furnace Building |
| 8 | Fabrication Complex |
| 9 | Newly Completed Soaking Pits |
| 10 | New Blooming/Slabbing Mill |
| 11 | Unidentified Facility |
| 12 | Rolling Mill Under Construction |
| 13 | Two Large Blast Furnaces |

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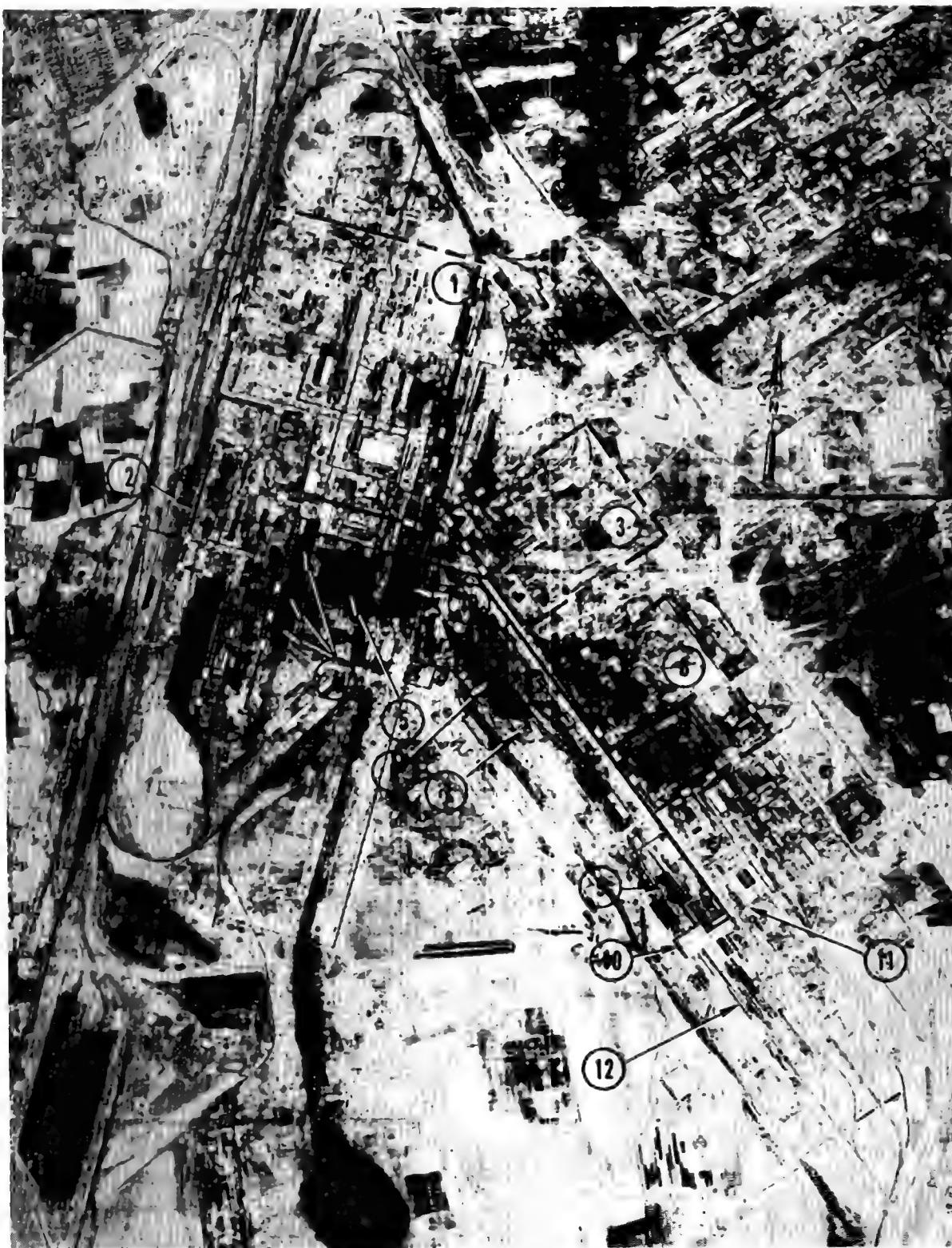


FIGURE 14. PAO-TOU IRON AND STEEL PLANT.

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IMAGERY ANALYSIS SERVICE

PEN-CHI IRON AND STEEL PLANT

The Pen-chi Iron and Steel Plant is located in the southwest section of Pen-chi, China, at 41-16N 123-44E (Figure 1, Item 19). An older portion of the plant is located in the northeast section of the city at 41-19N 123-46E.

25X1

A comparative analysis of the facilities at both locations from photography dated [redacted] revealed the completion of the third by-products coke oven battery at the southwest plant area. No other changes were noted at either plant during this time period.

The facilities at the southwest plant area include three by-products coke oven batteries with an associated by-products section, two medium blast furnaces, a thermal power plant, an iron ore sintering plant, a firebrick plant, three rolling mills, and four fabrication buildings. The facilities at the northeast plant include two by-products coke oven batteries with an associated by-products section, two medium blast furnaces, a probable side-blown converter shop, and a thermal power plant. The facilities in both plant areas appeared highly active on [redacted]

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IMAGERY ANALYSIS SERVICE

SHANG-HAI IRON AND STEEL PLANT NO. 1

The Shang-hai Iron and Steel Plant No. 1 is located on the northern edge of Shang-hai, China, at 31-21N 121-29E (Figure 1, Item 20).

A study of this plant was accomplished using all available [redacted] photography. The study revealed the construction of a basic oxygen furnace building with an associated precipitation facility, the construction of four new support buildings and a gasholder in the by-products coke plant, and an addition to a rolling mill.

25X1

The basic oxygen furnace building along with the precipitation facility (Annotations 12 and 13, Figure 14) were constructed between [redacted] [redacted] but these facilities were not seen in operation until [redacted]. The area the furnace building now occupies was the site of four side-blown converters prior to [redacted]. The oxygen furnace building has been built adjacent to the old side-blown converter building, and the old converter building has been lengthened [redacted] to provide additional space for oxygen furnace equipment. The completed furnace building has three small protrusions on its roof which are probably lance houses. A lance house contains the equipment used to raise and lower an oxygen lance into an oxygen furnace. The presence of three of these houses, on the roof of this building indicates the presence of three oxygen furnaces inside the building. This building [redacted] and by U.S. standards it could contain furnaces up to a 75-ton capacity.

25X1

25X1

The oxygen supply for the furnaces is provided by an air separation plant which is located 1 nm southwest of the furnace building. Construction of the oxygen plant was first noted in the mid-stages on [redacted] photography. An analysis of subsequent coverage dated [redacted] revealed the plant to be complete. The facilities at the oxygen plant consist of a compressor building, a gasholder, a cooling tower, and five support buildings. The gasholder is connected by an above-ground pipeline to the oxygen furnace building.

25X1

25X1

The total facilities at the iron and steel plant consist of five by-products coke oven batteries with an associated by-products section, six beehive coke ovens, four small and two large blast furnaces, two side-blown converter shops, a basic oxygen furnace building, a blooming and slabbing mill, a steel foundry, a rolling mill, a limestone preparation plant, and a thermal power plant. All of these facilities appeared highly active on all [redacted] photography.

The following annotations are keyed to Figure 15:

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IMAGERY ANALYSIS SERVICE

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|-------------------------------------|
| 1 | Coke By-Product Plant |
| 2 | Five By-Product Coke Oven Batteries |
| 3 | Two Blast Furnaces |
| 4 | Side-Blown Converter Shop |
| 5 | Steel Foundry |
| 6 | Blooming/Slabbing Mill |
| 7 | Rolling Mill |
| 8 | Addition to Rolling Mill |
| 9 | Four Small Blast Furnaces |
| 10 | Thermal Power Plant |
| 11 | Side-Blown Converter Shop |
| 12 | Basic Oxygen Furnace Building (New) |
| 13 | Gas Collection Facility (New) |
| 14 | Limestone Preparation Plant |

25X1

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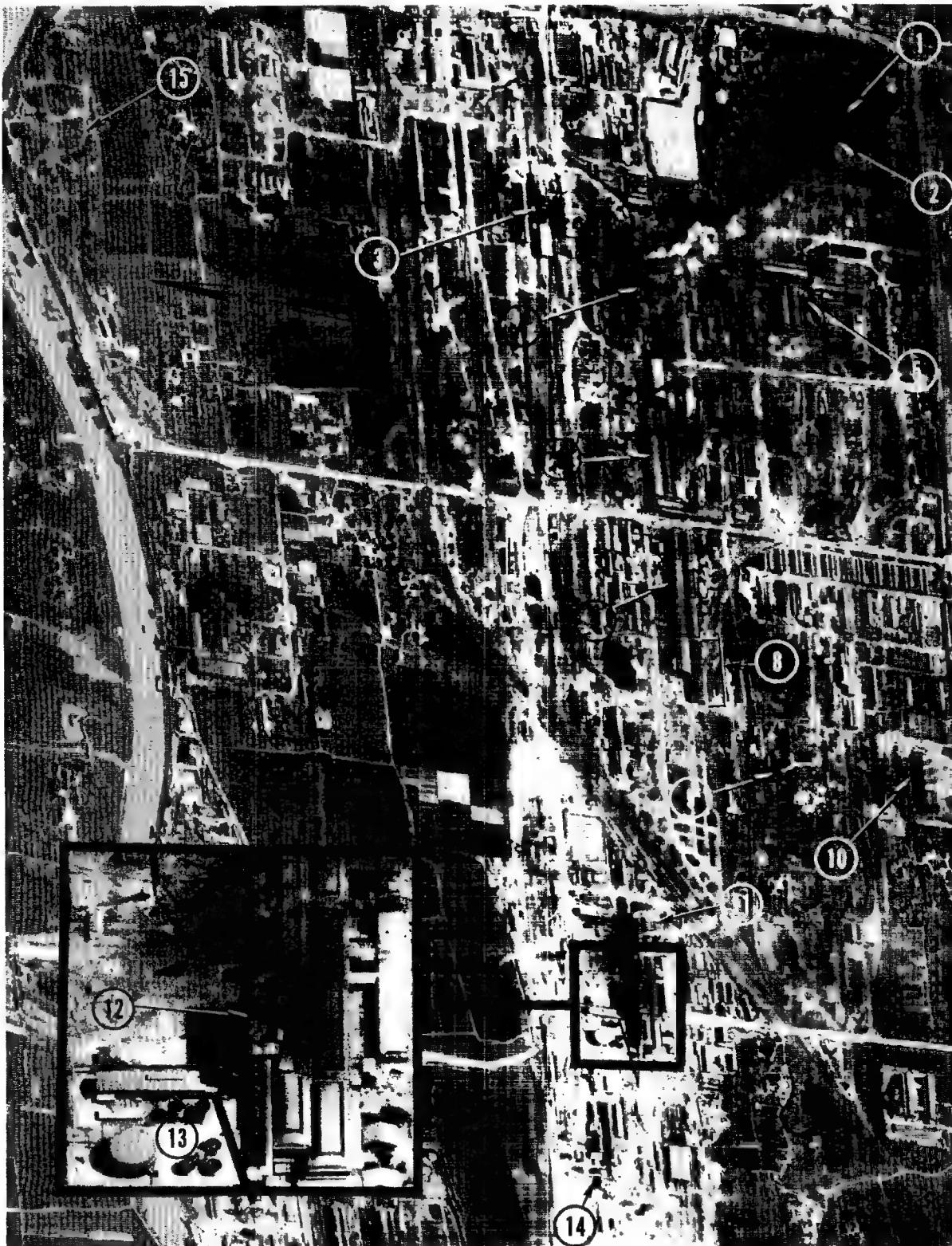


FIGURE 15. SHANG-HAI IRON AND STEEL PLANT NO. 1

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25X1

IMAGERY ANALYSIS SERVICE

SHIANG-HAI IRON AND STEEL PLANT NO. 3

The Shang-hai Iron and Steel Plant No. 3 is located in the southern section of Shang-hai, China, at 31-10N 121-28E (Figure 1, Item 21).

A study of this plant using all [redacted] photographic imagery revealed no significant change to the facilities [redacted]. The facilities consist of two side-blown converter shops, two blooming/slabbing mills, and five rolling mills. All of these facilities except one of the side-blown converter shops appeared moderately active on [redacted]. The one side-blown converter shop was inactive.

25X1

25X1

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IMAGERY ANALYSIS SERVICE

SHANG-HAI IRON AND STEEL PLANT NO. 5

The Shang-hai Iron and Steel Plant No. 5 is located on the northern edge of Shang-hai, China, at 31-23N 121-29E (Figure 1, Item 22).

25X1
25X1
25X1

A comparative analysis of this plant using [redacted] 25X1 [redacted] photography revealed the addition of two support buildings. No other changes were noted from [redacted] imagery. An analysis from poor quality imagery dated [redacted] revealed no further changes.

25X1

The facilities at this plant include a limestone preparation plant, a producer-gas plant, a thermal power plant, two fabrication buildings, a blooming/slabbing mill, a two-stack open hearth furnace building (attached to the blooming/slabbing mill), and a side-blown converter shop. The base for a third stack to serve the open hearth furnace building was visible [redacted] 25X1 [redacted] photography, but it remains unchanged on [redacted] 25X1 [redacted] photography. Due to the poor quality of the [redacted] 25X1 [redacted] photography, the level of activity at the plant could not be determined; however, all facilities appeared highly active [redacted] 25X1

25X1

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25X1

IMAGERY ANALYSIS SERVICE

SHEN-YANG IRON AND STEEL PLANT

The Shen-yang Iron and Steel Plant is located in the northeast section of Shen-yang, China, at 41-50N 123-30E (Figure 1, item 23).

A study of this plant using [redacted] imagery revealed the addition of two fabrication buildings and the removal of the coke and ore handling building serving the plant's blast furnaces. The plant now consists of two small blast furnaces, a probable side-blown converter shop, two forge/foundry buildings, and two fabrication buildings. All of these facilities except the two blast furnaces appeared moderately active [redacted]. The blast furnaces appeared inactive.

25X1

The following annotations are keyed to Figure 1:

Annotation

1

2

3

4

Facility

Two Forge/Foundry Buildings

Probable Side-Blown Converter Shop

Two Small Blast Furnaces

Two Fabrication Buildings

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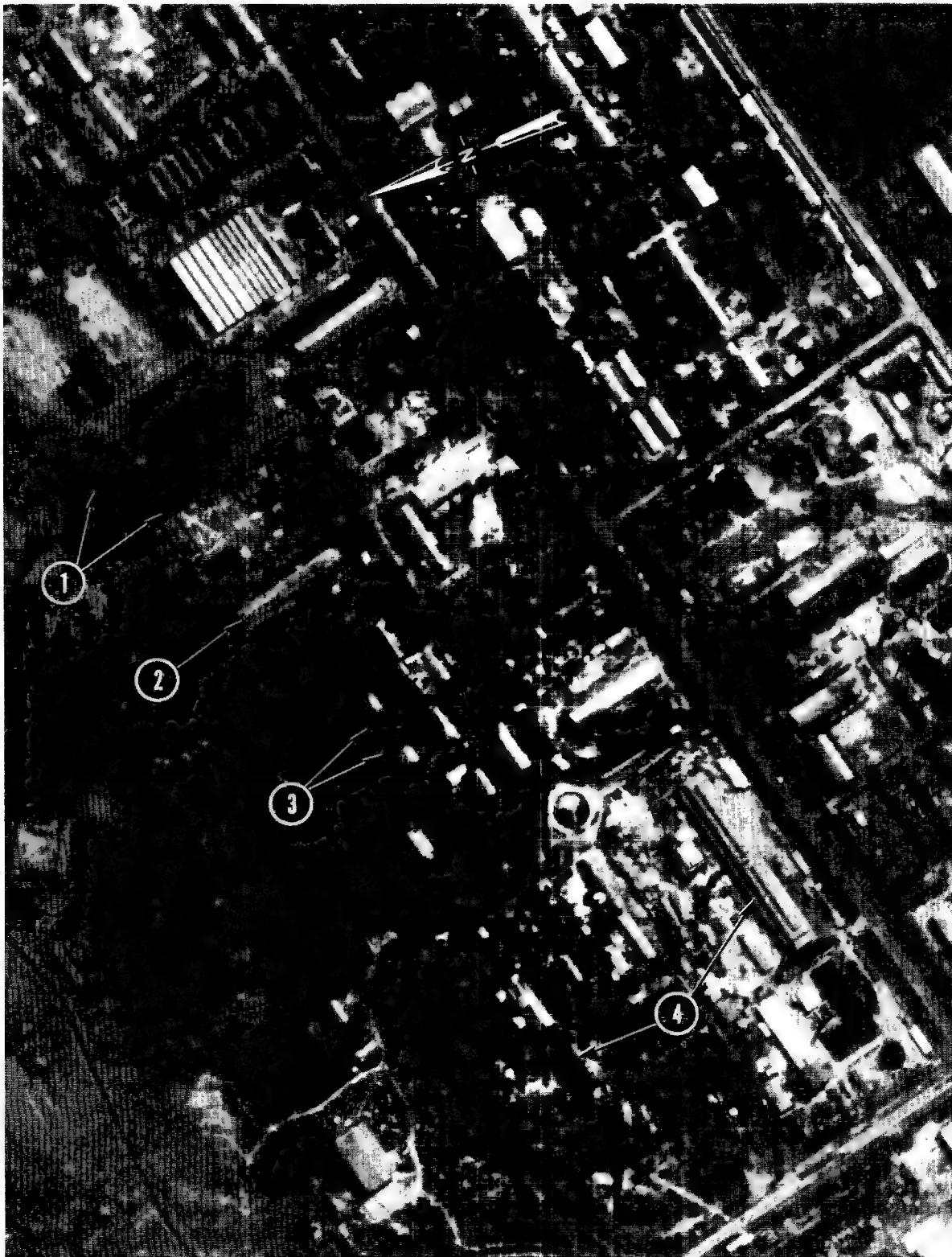


FIGURE 16. SHEN-YANG IRON AND STEEL PLANT,

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IMAGERY ANALYSIS SERVICE

SHIH-TSUI-SHAN IRON PLANT

The Shih-tsui-shan Iron Plant is located approximately 4 nm south of Shih-tsui-shan, China, at 39-08N 106-49E (Figure 1, Item 25).

A comparative analysis of [redacted] imagery revealed no significant change to the plant's facilities. The plant consists of 12 beehive coke ovens, one small and one medium blast furnace, a steam plant, and two fabrication buildings. The facilities appeared inactive [redacted]

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IMAGERY ANALYSIS SERVICE

TAI-YUAN IRON AND STEEL PLANT

The Tai-yuan Iron and Steel Plant is located on the north edge of Tai-yuan, China, at 37-56N 112-32E (Figure 1, Item 26).

A comparative analysis of [redacted] photography revealed extensive construction activity at this plant. The facilities constructed during this period consist of a 1,910-foot rolling mill, a soaking pit, a producer-gas plant, 14 support buildings, an alloying building, a fifty percent expansion of the large thermal power plant, and a 340-foot* extension to an old rolling mill. In addition to this construction, an iron ore sintering plant, two finishing mills, an air separation plant, and a possible basic oxygen furnace building were seen under construction [redacted]

25X1

The only facilities that were removed from the plant were the two small blast furnaces that were located in the northern section. This removal occurred [redacted]

25X1

The possible basic oxygen furnace building is located in the center of the plant, and it was observed in the early stages of construction on [redacted] photography (Annotation 13, Figure 17). The size of this building cannot be accurately determined, but it appears to be larger than either the Shih-ching-shan or the Shang-hai basic oxygen furnace buildings. When completed, this building will probably be served by an oxygen pipeline from the nearby air separation plant (Annotation 15, Figure 17) now nearing completion.

The total completed facilities at the iron and steel plant consist of three by-products coke oven batteries with two associated by-products sections, two medium and one large blast furnace, an open hearth furnace building, a soaking pit, a blooming/slabbing mill, a heat and thermal power plant, two side-blown converter shops, a producer-gas plant, and four rolling mills. All of these facilities except the two side-blown converter shops appeared highly active [redacted] The side-blown converter shops appeared inactive.

25X1

The following annotations are keyed to Figure 18:

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|--------------------------------|
| 1 | Producer Gas Plant (New) |
| 2 | Coke By-Products Plant |
| 3 | Iron Ore Sintering Plant (U/C) |

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IMAGERY ANALYSIS SERVICE

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|---|
| 4 | Blast Furnace |
| 5 | By-Products Coke Oven Battery |
| 6 | Coke By-Products Plant |
| 7 | Two By-Products Coke Oven Batteries |
| 8 | Two Blast Furnaces |
| 9 | Open Hearth Furnace Building |
| 10 | Fabrication Building |
| 11 | Rolling Mill |
| 12 | Thermal Power Plant |
| 13 | Possible Basic Oxygen Furnace Building (1/1) |
| 14 | Fourteen Support Buildings (New) |
| 15 | Air Separation Plant (New) |
| 16 | Electrical Sub-Station |
| 17 | Soaking Pit |
| 18 | Blooming/Slabbing Mill |
| 19 | Two Rolling Mill (U/C) |
| 20 | Three Rolling Mills |
| 21 | Fire Brick Plant |
| 22 | Two Side-Blown Converter Shops |
| 23 | Two Blast Furnaces Removed |
| 24 | New Addition to Rolling Mill |

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MAGERY ANALYSIS SERVICE



FIGURE 18. TAI-YUAN IRON AND STEEL PLANT,

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MATERIAL ANALYSIS SECTION

TANG-SHAN IRON AND STEEL PLANT

The Tang-shan iron and steel plant is located in the northern sector of Tang-shan, China, at 39°38'N 116°33' (Fig. 1, Item 27).

25X1

25X1

IRON ORE USED IN THIS PLANT WAS ACCORDING TO ANALYSIS FROM [REDACTED] PHOTOGRAPHY. THE ANALYSIS REVEALED NO SIGNIFICANT CHANGE TO THE FACILITIES. THE FACILITIES INCLUDE THREE SMALL BLAST FURNACES, TWO SIDE-DOWN CONVERTER SHOPS, A SCRAPING PIT, A BLOOMING

[REDACTED]

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IMAGERY ANALYSIS SERVICE

TA-YEH IRON AND STEEL PLANT

The Ta-yeh Iron and Steel Plant is located approximately 10 nm northeast of Ta-yeh, China, at 30-12N 115-07E (Figure 1, Item 28). The iron production facilities of this plant are located approximately 7 nm west of the main plant area at 30-11N 114-59E.

An analysis of the iron and steel production facilities was accomplished from [redacted] photography. This analysis revealed no significant change to the facilities at either location.

The facilities located at the iron production area consist of four medium blast furnaces and 12 support buildings. This entire area appeared inactive on the [redacted] photography.

The main plant area contains an open hearth furnace building, a soaking pit, two blooming/slabbing mills, six rolling mills, a probable steel foundry, and a producer-gas plant. All of these facilities appeared moderately active [redacted]

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'TIEN-CHING STEEL PLANT'

The Tien-ching Steel Plant is located in the southern sector of Tien-ching, China, at 39-05N 117-16E (Figure 1, Item 29).

A study of this plant from [redacted] photography revealed no significant change to the plant's facilities. The facilities at this plant consist of two side-blow converter shops and a blooming/slabbing mill. All three facilities appeared moderately active [redacted]

25X1

The following annotations are keyed to Figure 19:

| Annotation | Facility |
|------------|-------------------------------|
| 1 | Two Side-Blow Converter Shops |
| 2 | Blooming/Slabbing Mill |

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FIGURE 19. TIEN CHING STEEL PLANT.

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TI-HUA IRON AND STEEL PLAN

The Ti-Hua Iron and Steel Plant is located 9 nm west-northwest of Ti-hua, China, at 43-50N 087-17E (Figure 1, Item 30).

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An analysis of this plant from photography [redacted] revealed no significant change to the facilities.

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The plant contains ten beehive coke oven batteries, a large blast furnace, a side-blown converter shop, a blooming/slabbing mill, two rolling mills, four fabrication buildings, and a probable fire brick plant. These facilities appeared moderately active [redacted]

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The following annotations are keyed to Figure 20:

| Annotation | Facility |
|------------|---------------------------------|
| 1 | Ten Beehive Coke Oven Batteries |
| 2 | Side-Blown Converter Shop |
| 3 | Two Rolling Mills |
| 4 | Fabrication Building |
| 5 | Blooming/Slabbing Mill |
| 6 | Blast Furnace |
| 7 | Probable Fire Brick Plant |
| 8 | Fabrication Building |

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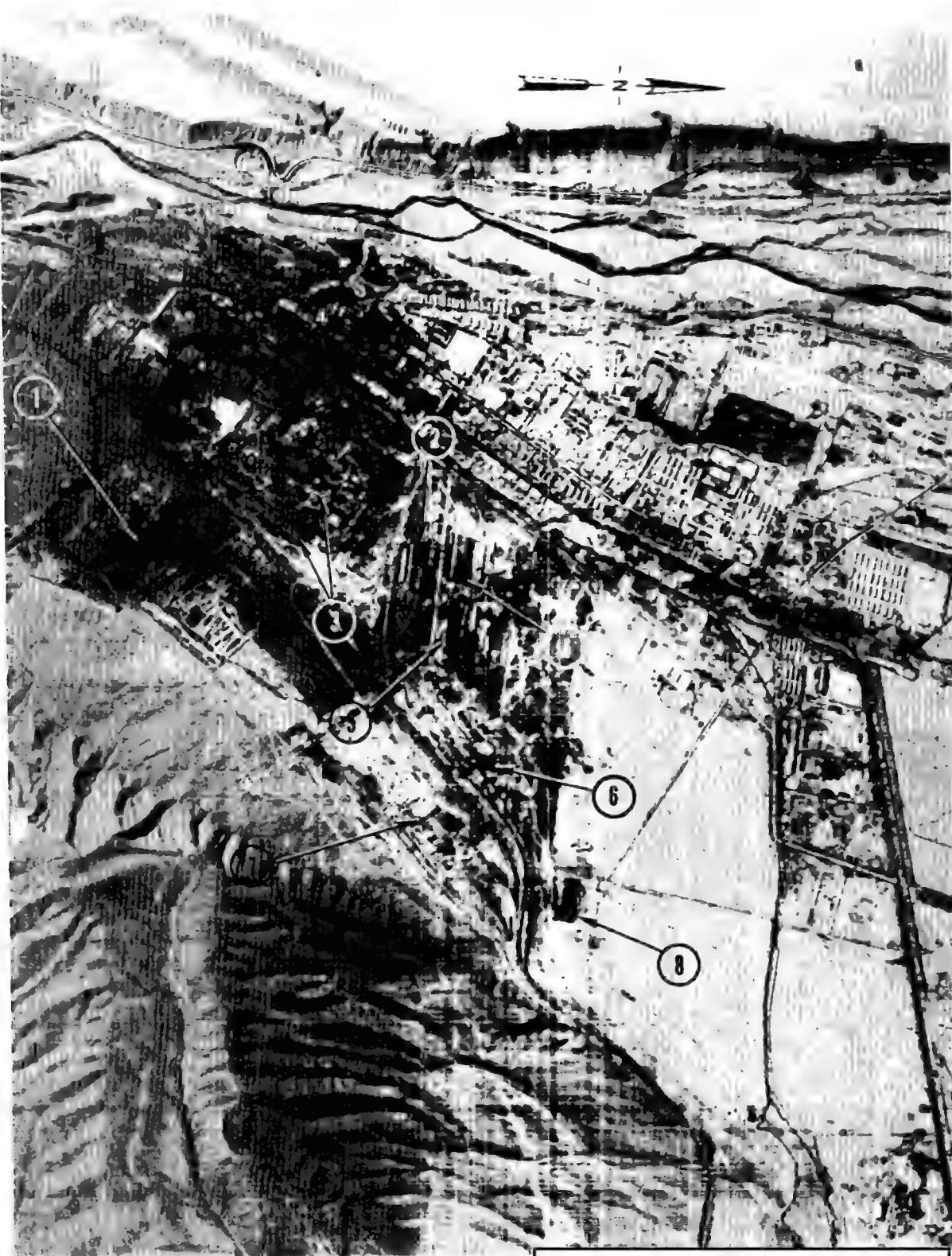


FIGURE 20. THHUA IRON AND STEEL PLANT.

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WU-HAN IRON AND STEEL PLANT

The Wu-han iron and Steel Plant is located 9 m northeast of Wu-han, China, at 30-38N 114-27E (Figure 1, Item 31).

The plant was studied from imagery [redacted]

[redacted] The study revealed the completion of a rolling mill, an addition to the blooming and slabbing mill, and the construction of two support buildings. The rolling mill (Annotation 6, Figure 20) was first noted in the early stages of construction [redacted] but it was not until [redacted] [redacted] that it was seen completed. Construction on the blooming and slabbing mill that is attached to the new rolling mill was also first noted in the early stages on [redacted]. This mill was complete when observed on [redacted] (Annotation 5, Figure 20). It now measures approximately 2,350 feet* long.

The facilities at this plant include five by-products coke oven batteries, a by-products section, two small and three large blast furnaces, a thermal power plant, an open hearth furnace building, a soaking pit, a blooming and slabbing mill, two rolling mills, seven fabrication buildings, an ore sintering plant, and an unidentified facility. All of these facilities except the two small blast furnaces appeared highly active on [redacted]. The two small blast furnaces appeared inactive.

The most recent photography [redacted] has not been used because of its poor quality.

The following annotations are keyed to Figure 21:

| <u>Annotation</u> | <u>Facility</u> |
|-------------------|--------------------------------------|
| 1 | Unidentified Facility |
| 2 | By-Products Coke Oven Section |
| 3 | Open Hearth Furnace Building |
| 4 | Soaking Pit |
| 5 | Blooming and Slabbing Mill |
| 6 | New Rolling Mill |
| 7 | Rolling Mill |
| 8 | Seven Fabrication Buildings |
| 9 | Thermal Power Plant |
| 10 | Iron Ore Sintering Plant |
| 11 | Three Large Blast Furnaces |
| 12 | Five By-Products Coke Oven Batteries |
| 13 | Two Small Blast Furnaces |

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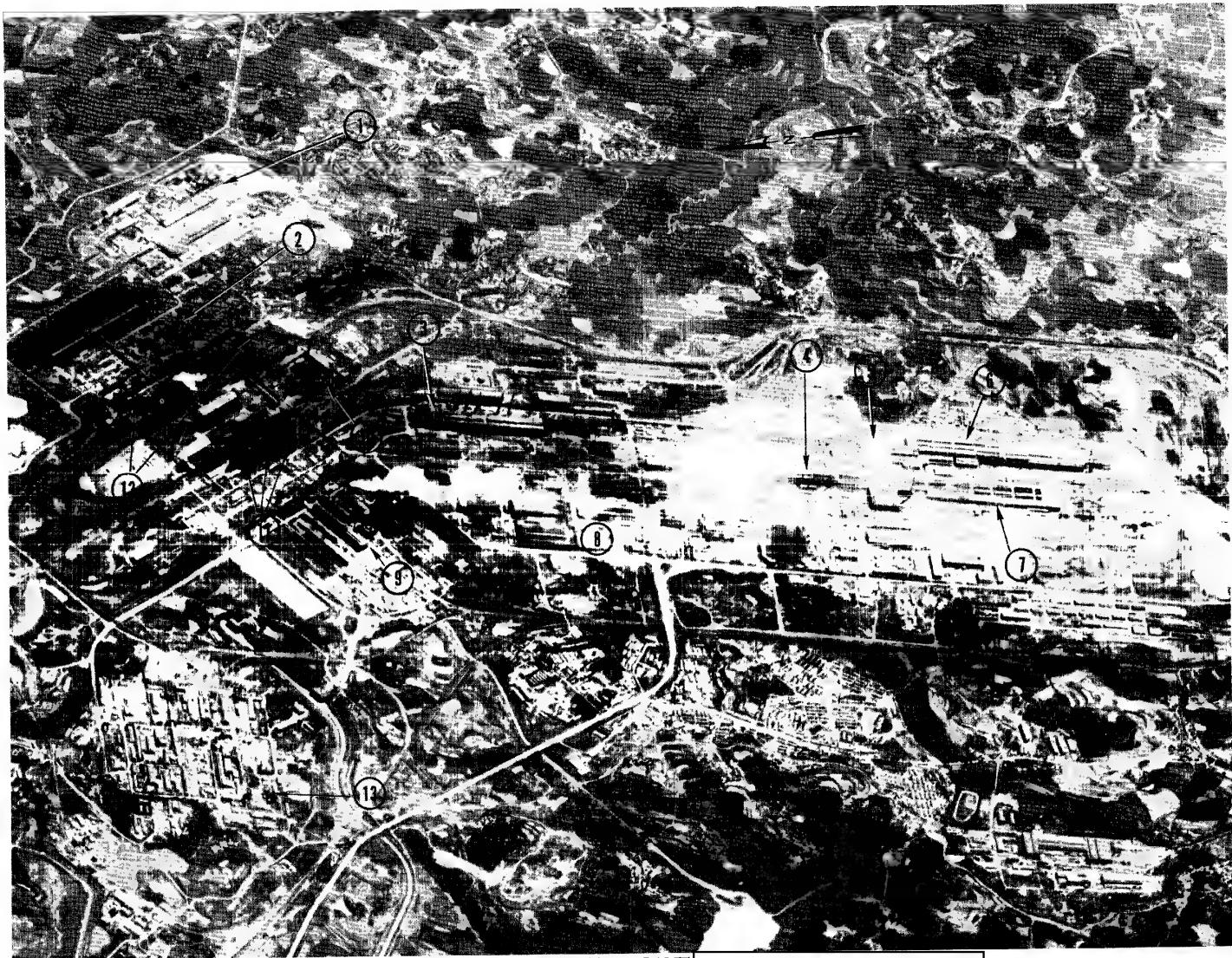


FIGURE 21. WU-HAN IRON AND STEEL PLANT.

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The following table presents the total new construction seen at the 31 Communist Chinese iron and steel plants described in this report. For more detailed information, see the individual plant studies.

TABLE I. New Construction at Chinese Iron and Steel Plants Studied

| <u>Construction Completed</u> | <u>Total</u> |
|---|--------------|
| By-Products Coke Oven Batteries | 1 |
| Basic Oxygen Furnace Buildings | 1 |
| Soaking Pits | 2 |
| Rolling Mills Changed From Side-Blown Converter Shops | 2 |
| Blooming/Slabbing Mills | 1 |
| Blooming/Slabbing Mill Extensions | 1 |
| Rolling Mills | 2 |
| Rolling Mill Extensions | 3 |
| Fabrication Buildings | 4 |
| Producer-Gas Plants | 2 |
| Alloying Building | 1 |
| Thermal Power Plant Expansions | 1 |
| Gasholders | 1 |
| Support Buildings | 1 |
| Unidentified Facilities | 62 |
| | 1 |

Construction Continuing

| <u>Total</u> |
|---|
| By-Products Coke Oven Batteries |
| Coke By-Products Sections |
| Blast Furnaces |
| Basic Oxygen Furnace Buildings |
| Open Hearth Furnace Building Extensions |
| Rolling Mills |
| Fabrication Buildings |
| Iron Ore Sintering Plants |
| Air Separation Plants |

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The following table enumerates the total iron and steel facilities seen at the 31 iron and steel plants analysed in this report. The production capacities of these facilities are not indicated, and it should be noted that they vary widely. Facilities that are under construction are also included in this table.

TABLE II. Summation of Major Facilities Observed
at Chinese Iron and Steel Plants Studied

| | <u>Total</u> |
|----------------------------------|--------------|
| Beehive Coke Ovens | 112 |
| By-Products Coke Oven Batteries | 45 |
| Coke By-Products Sections | 15 |
| Large Blast Furnaces | 32 |
| Medium Blast Furnaces | 31 |
| Small Blast Furnaces | 45 |
| Open Hearth Furnace Buildings | 11 |
| Basic Oxygen Furnace Buildings | 3 |
| Side-Blown Converter Shops | 25 |
| Soaking Pits | 8 |
| Blooming/Slabbing Mills | 17 |
| Rolling Mills | 53 |
| Fabricating Buildings | 43 |
| Machine Shops | 9 |
| Foundries | 5 |
| Forge/Foundries | 15 |
| Thermal Power Plants | 11 |
| Steam Plants | 1 |
| Producer-Gas Plants | 5 |
| Air Separation Plants | 3 |
| Fire Brick Plants | 6 |
| Iron Ore Preparation Plants | 7 |
| Coal Preparation Plants | 1 |
| Limestone Preparation Plants | 7 |
| Pattern Shops | 1 |
| Warehouses and Support Buildings | numerous |
| Unidentified Facilities | 2 |

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